Fermilab

Status report, February 24, 2006

Fermilab's Program to Manage Low Levels of Tritium in Surface Water

Overview

In November 2005, Fermilab's regular environmental monitoring program detected low levels of tritium in ponds on the Fermilab site and in Fermilab's Indian Creek. This is the first time tritium has been detected in these surface waters. The levels found are far lower than the federal water standards that Fermilab is required to meet. Fermilab is committed to keeping releases of tritium via water discharges well below the required limits. We are taking steps to keep the levels as low as reasonably achievable, both now and in the future.

What is tritium?

Tritium is a weakly radioactive isotope of the element hydrogen with a half-life of 12.3 years. Tritium emits low-energy particles that cannot penetrate the skin. People could be harmed by tritium only through internal exposure caused by regularly drinking water with high levels of tritium over many years. Tritium is produced at Fermilab as a byproduct of accelerator operations. The low levels of tritium found in Indian Creek and in the Fermilab ponds come from the NuMI/MINOS experiment begun in February 2005.

Does this tritium constitute a health risk to Fermilab neighbors?

No. The levels found in Indian Creek are extremely low compared to what is safe for a lifetime of continuous exposure to tritium in surface water. The following table illustrates how tritium concentrations found at Fermilab compare to safe concentrations in surface water. The levels are specified in picocuries (pCi, the amount of radiation produced) per milliliter (ml, metric volume) of water. The regulatory standard for drinking water is also listed, even though the water leaving the Fermilab site poses no threat to drinking water.

A Guide to Current Concentrations of Tritium at Fermilab, February 2006		
Federal Surface Water Standards (These are the standards that apply to Indian Creek and Fermilab ponds.)	2,000 pCi/ml	Standard for continuous, safe external exposure to water, established by the U.S. Department of Energy
Federal Drinking Water Standards (Tritium from Fermilab does not affect drinking water.)	20 pCi/ml	Standard for water safe to drink, established by the U.S. Environmental Protection Agency (EPA)
Current concentrations in on-site ponds (Feb. 2006)	3 pCi/mll	Average found in surface water on site
Concentrations at Indian Creek outflow in November 2005	3 pCi/ml	Highest level of tritium ever found to leave the Fermilab site (November 2005)
Current tritium concentrations at Indian Creek outflow (Feb. 2006)	below detection limit	Typical level since initial corrective measures taken in December 2005
Detection limit for tritium	1 pCi/ml	Lower limit of detection achieved by standard tritium detection techniques

What is Fermilab doing?

1. In December 2005, **Fermilab identified the major contributor** to the tritium found in the Indian Creek discharge and the Fermilab ponds. We **reduced the level of tritium** in the water pumped out of the NuMI/MINOS experimental halls by half. Fermilab is now conducting an intensive investigation to identify the origin of the remaining tritium produced by the NuMI/MINOS experiment and to minimize its impact on surface waters.

2. **Fermilab has revised its water monitoring program** to gather more comprehensive results more often, with adjustments made as needed:
   - Indian Creek is being monitored regularly and all results are posted on the Web at **http://www.fnal.gov/pub/about/community/chart.html**
   - Kress Creek is being monitored regularly and no detectable tritium has been found to date.
   - Ferry Creek cannot be monitored yet as it is dry at this time.
   - Ponds on the Fermilab site that could release water into Kress Creek and Ferry Creek are monitored daily to weekly.

3. **The Fermilab director has appointed a Surface Water Quality Task Force** to monitor and evaluate this issue, and Fermilab has **consulted the Fermilab Community Task Force for Public Participation.** The Surface Water Quality Task Force includes a non-Fermilab member of the Community Task Force.

Fermilab Surface Water Quality Task Force Goals

- Identify all current and potential future sources of tritium.
- Develop minimization strategies.
- Develop a water management plan to minimize site discharges.
- Establish near, intermediate, and long-term goals for site discharges.
- Update monitoring program.
- Develop a communication plan for interacting with our neighbors.

4. **Fermilab is developing long-term strategies for minimizing tritium levels** that will address the planned increase in research activities that produce tritium as a by-product.

Fermilab's commitment to the public

Fermilab is committed to go beyond merely satisfying the regulatory limits; to reduce tritium discharges to levels as low as reasonably achievable; to keep the public fully informed; and to engage the public in the establishment of goals and formulation of plans.

For further information

If you have any concerns or questions about this situation, please call Judy Jackson, Fermilab's Office of Public Affairs, at 630-840-3351 or go to www.fnal.gov/pub/about/community/

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